1   ## PRINTING A TRUE-INK REFERENCE, AND REFINING GRAY ACCURACY,

2   ## FOR OPTIMUM COLOR CALIBRATION IN INCREMENTAL PRINTING

3

4

5   ## ABSTRACT OF THE DISCLOSURE

6

7   Ramps are printed with ink of a particular color, and

8   also nominally in that color but by inks of other colors.

9   A measured actual-ink ramp is a standard to fix the other-

10 colors ramp, and correct other printing in those colors.

11 In one aspect a particular color is gray, actual ink black

12 (K), and other-color inks magenta (M), yellow (Y) and cyan

13 (C).   In another aspect, actual ink is red (R), green (G)

14 or blue (B); other colors M, Y and C in respective pairs.

15 For gray/black, the K ramp is a zero-chroma standard to

16 lower composite-black (cK) chroma below ~2.5 ΔE. A sam-

17 pling aspect prints for each gray tone plural cK-ink com-

18 binations preferably bracketing nominal gray values; and

19 searches these combinations to get one nearest the partic-

20 ular gray — or most closely bracketing it, for interpola-

21 tion — for best match. Bracketing is best optimized, by

22 a color-space pattern centered on nominal. A modeling as-

23 pect inserts measured-ramp values into printer color-model

24 equations, and solves (best by iteration) for best match.

25 Equations are best of form $H = D \cdot E \cdot \ \ldots \ \cdot F$; H a hybrid

26 of two or more colors D, E . . . ; F a correction factor.

27 In some expressions $H = cK$, $D = S_1$ and $E = S_2$ (S_1 and S_2

28 secondaries); in others $H = S$, $D = P_1$ and $E = P_2$ (P_1 and P_2

29 primaries). Another aspect models in a space transformed

30 by shrinking primary axes near neutral; after calibration

31 in shrunk space, an inverse transform reexpands results.